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TO: Interested Parties

NOTICE OF AVAILABILITY OF ERRATA AND REVISED AVENA DRAIN/AMMONIA FACT SHEET FOR THE CENTRAL VALLEY REGIONAL BOARD'S "FINAL STAFF REPORT ON RECOMMENDED CHANGES TO CALIFORNIA'S CLEAN WATER ACT SECTION 303(D) LIST"

The California Regional Water Quality Control Board, Central Valley Region (Regional Board) staff is noticing the availability of errata to Appendix B of the "Final Staff Report on Recommended Changes to California's Clean Water Act Section 303(d) List" (Report) and of a revised final fact sheet for the Avena Drain ammonia listing. Copies of these documents can be found at <http://www.swrcb.ca.gov/rwqcb5/programs/tmdl/index.htm>.

The errata show revisions to the "Evidence of Impairment" section in underline (corrected value)/strikeout (replaced value) format for seven waterbody/pollutant pairs. Each section was revised so that data values in the text match the correct data values presented in tables B-2 for each waterbody/pollutant pair. The errata also include revisions to tables B-2 for Colusa Basin Drain (diazinon), Del Puerto Creek (chlorpyrifos), and Sutter Bypass (diazinon). The revisions to the data tables do not change our recommendations for the associated additions to the 303(d) list.

The revised final fact sheet for Avena Drain (ammonia) replaces the previously-provided fact sheet in Appendix B of the Report. Although the fact sheet was revised, the data still support the recommendation for adding Avena Drain for ammonia to the 303(d) list.

Questions on the Regional Board's Report can be directed to Joe Karkoski at (916) 255-3368.

California Environmental Protection Agency



The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at <http://www.swrcb.ca.gov/rwqcb5>

Errata for Appendix B

B.1.16 Colusa Basin Drain, Diazinon

Evidence of Impairment

Between 1994 and 2000, multiple studies analyzed a total of 56 ambient water samples collected from the CBD at Road 99E, near Knights Landing, for diazinon (Table B-2). Most samples were collected during the orchard dormant spray season. Overall, 14 of 56 samples (about 25%) contained diazinon concentrations at or above CDFG chronic water quality criterion of 0.05 µg/L and 10 of 56 (about 18%) samples exceeded CDFG acute water quality criterion of 0.08 µg/L.

Table B-2. Summary of Diazinon Concentrations in the Colusa Basin Drain

Data Source	Sample Years	Number of Sample Dates	Range of Diazinon Concentrations	Criteria ^a		Number of Sample Dates Equal to or Above Criteria	Percent of Sample Dates Equal to or Above Criteria
Holmes <i>et al</i> , 2000	1994	29	nd - 0.42 µg/L	Chronic	0.05 µg/L	11	38%
				Acute	0.08 µg/L	9	31%
Domagalski, 2000	1996	2	nd	Chronic	0.05 µg/L	0	0%
				Acute	0.08 µg/L	0	0%
Domagalski, 2000	1997	15	nd - 0.073 µg/L	Chronic	0.05 µg/L	2	130%
				Acute	0.08 µg/L	0	0%
Domagalski, 2000	1998	4	0.007 - 0.098 µg/L	Chronic	0.05 µg/L	1	25%
				Acute	0.08 µg/L	1	25%
Dileanis, <i>et al</i> , 2001	2000	6	nd - 0.038 µg/L	Chronic	0.05 µg/L	0	0%
				Acute	0.08 µg/L	0	0%
Summary	1994 - 2000	56	nd - 0.42 µg/L	Chronic	0.05 µg/L	14	25%
				Acute	0.08 µg/L	10	18%

^a CDFG water quality criteria for the protection of aquatic life (Siepmann and Finlayson, 2000)

nd = not detected

B.1.18 Del Puerto Creek, Chlorpyrifos

Evidence of Impairment

Several studies have measured chlorpyrifos levels in Del Puerto Creek (Table B-2). The samples analyzed for these studies were collected between January and June, 1991 to 1993. Ten of the 30 samples (33%) analyzed for chlorpyrifos exceeded the CDFG chronic water quality criterion for chlorpyrifos, and ten of the samples (33%) exceeded the CDFG acute criterion.

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Table B-2. Summary of Chlorpyrifos Concentrations in Del Puerto Creek

Data Source	Sample Years	Number of Sample Dates	Range of Chlorpyrifos Concentrations	Criteria ^a		Number of Sample Dates Equal to or Above Criteria	Percent of Sample Dates Equal to or Above Criteria
Ross 1992 and 1993; Ross <i>et al</i> , 1996 and 1999; Fujimura, 1991a,b and 1993a,b,c,d	1991-1993	8	nd	Chronic	0.014 µg/L	0	0%
				Acute	0.02 µg/L	0	0%
Foe, 1995	1991	8	nd – 0.12 µg/L	Chronic	0.014 µg/L	3	38%
				Acute	0.02 µg/L	3	38%
Foe, 1995	1992	14	nd – 0.04 µg/L	Chronic	0.014 µg/L	7	50%
				Acute	0.02 µg/L	7	50%
Summary	1991-1993	30	nd – 0.12 µg/L	Chronic	0.014 µg/L	10	33%
				Acute	0.02 µg/L	10	33%

^a CDFG water quality criteria for the protection of aquatic life (Siepmann and Finlayson, 2000)

nd = not detected

B.1.19 Del Puerto Creek, Diazinon

Evidence of Impairment

Several studies have measured diazinon concentrations in Del Puerto Creek (Table B-2). The samples analyzed for these studies were collected between January and June 1991 to 1993. Ten of the 30 samples (33%) analyzed for diazinon exceeded the CDFG chronic water quality criterion for diazinon, and nine of the 30 samples (30%) exceeded the CDFG acute criterion.

B.1.24 Ingram/Hospital Creek, Diazinon

Evidence of Impairment

Between 1991 and 1993, multiple studies analyzed a total of 32 water samples collected from Ingram/Hospital Creek for diazinon. Sixteen of the 32 samples (50%) analyzed for diazinon exceeded the CDFG chronic water quality criterion for diazinon, and eleven of the 32 samples (34%) exceeded the CDFG acute criterion. The data are summarized in Table B-2.

B.1.25 Jack Slough, Diazinon

Evidence of Impairment

Between 1994 and 2000, the Regional Board and the USGS monitoring studies analyzed a total of 19 ambient water samples collected in Jack Slough, during rain events, for diazinon. Overall, 19 out of 19 samples (100%) exceeded the CDFG chronic water quality criteria of 0.05 parts per billion (ppb) and the acute water quality criteria of 0.08 ppb in January and February, coinciding with the orchard dormant spray season. Pollutant concentrations in ambient water samples collected from Jack Slough ranged up to more than 16 times the CDFG chronic water quality criteria. Table B-2 summarizes the available data.

B.1.34 Newman Wasteway, Chlorpyrifos

Evidence of Impairment

Between 1991 and 1993, a total of ten ambient water samples collected from the Newman Wasteway were analyzed for chlorpyrifos (Table B-2). Most samples were collected between January and April. Two of the ten (20%) samples contained chlorpyrifos concentrations at or above the CDFG chronic water quality criterion of .014 ug/l, and two of the ten (20%) were above the CDFG acute water quality criterion of 0.020 ug/l. Overall, chlorpyrifos concentrations in samples collected from Newman Wasteway ranged from less than 1 to 15 times the CDFG chronic water quality criteria (Foe, 1995; Ross, 1992, 1993; Ross *et al*, 1996, 1999; Fujimura, 1991a,b, 1993a,b,c,d).

B.1.51 Sutter Bypass, Diazinon

Evidence of Impairment

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Several studies have measured diazinon concentrations in water samples collected from the Sutter Bypass (Table B-2). These studies were conducted between December and March, the winter orchard dormant season. A total of 78 samples were analyzed for diazinon; of these 78 samples 18 (23%) exceeded the CDFG chronic water quality criterion for diazinon, and six (8%) exceeded the acute criterion (Nordmark, 1998, 1999, and 2000).

Table B-2. Summary of Diazinon Concentrations in the Sutter Bypass

Data Source	Sample Years	Number of Samples	Range of Diazinon Concentration	Criteria^a		Number of Samples Equal to or Above Criteria	Percent Samples Equal to or Above Criteria
Nordmark <i>et al</i> , 1998	Dec. 1996 – Mar. 1997	16	nd - 0.086 µg/L	Chronic	0.05 µg/L	4	25%
				Acute	0.08 µg/L	1	6%
Nordmark, 1998	Dec. 1997 – Mar. 1998	20	nd - 0.104 µg/L	Chronic	0.05 µg/L	5	25%
				Acute	0.08 µg/L	3	15%
Nordmark, 1999	Dec. 1998 – Mar. 1999	20	nd - 0.11 µg/L	Chronic	0.05 µg/L	7	35%
				Acute	0.08 µg/L	1	5%
Nordmark, 2000	Dec. 1999 – Mar. 2000	22	nd - 0.093 µg/L	Chronic	0.05 µg/L	2	9%
				Acute	0.08 µg/L	1	4%
Summary	1996 - 2000	78	nd - 0.11 µg/L	Chronic	0.05 µg/L	18	23%
				Acute	0.08 µg/L	6	8%

^a CDFG water quality criteria for the protection of aquatic life (Siepmann and Finlayson, 2000)

nd = not detected

Errata for Appendix B

B.1.1 Avena Drain, Ammonia

Summary of Proposed Action

The California Regional Water Quality Control Board, Central Valley Region, (Regional Board) recommends the addition of the Avena Drain to California's Clean Water Act Section 303(d) list due to impairment by ammonia. Information available to the Regional Board on ammonia levels indicates that water quality objectives are not being attained. The basis for this recommendation is given below.

Table B-1. 303(d) Listing/TMDL Information

Waterbody Name	Avena Drain	Pollutants/Stressors	Ammonia
Hydrologic Unit		Sources	Agriculture/Dairies
Total Length	8.5 Miles	TMDL Priority	
Size Affected	6.5 Miles	TMDL Start Date (Mo/Yr)	
Extent of Impairment	The upper 6.5 miles of Avena Drain	TMDL End Date (Mo/Yr)	
Upstream Extent Latitude	37° 50' 05"	Upstream Extent Longitude	121° 00' 27"
Downstream Extent Latitude	37° 50' 44"	Downstream Extent Longitude	121° 07' 37"

Watershed Characteristics

Avena Drain is a modified natural channel approximately 8.5 miles in length. The Avena Drain is tributary to Lone Tree Creek, which is tributary to the Delta. Storm water runoff (mainly from cropland) and irrigation tail water are the main sources of water. Due to the flow of tail water, the drain is no longer ephemeral during the dry season. Although there are few trees growing along the drain, there is some riparian vegetation.

Water Quality Objectives Not Attained

The narrative objective for toxicity is not being attained in the Avena Drain. The narrative toxicity objective in the Basin Plan states, in part, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." The narrative toxicity objective further states that "The Regional Water Board will also consider ... numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U.S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective (CRWQCB-CVR, 1998; <http://www.swrcb.ca.gov/~rwqcb5/bsnplnab.pdf>)."

Ammonia levels in Avena Drain frequently exceed the Basin Plan objective for toxicity. To maintain healthy aquatic life in fresh water, the California Department of Fish and Game (CDFG) has determined that ammonia levels (measured as NH₃) should not exceed 0.02 mg/L undissociated ammonia (CRWQCB-CVR, 2001a).

Evidence of Impairment

There are 12 dairies that have the potential and propensity to discharge wastewater containing manure, which can cause high ammonia levels, into Avena Drain. These discharges arise from the inability of the dairies to retain wastewater during the winter months, and from irrigation with wastewater during the spring, summer and fall. Between 1978 and 2000, multiple dairies have been cited for discharging wastewater to the Avena Drain. In March 1978, a "deposit in Avena Drain (of) dairy manure and wastes," caused "a severe fish kill," of more than 1,000 carp. Over a period of ten years, samples collected from water entering the drain and from the drain have shown undissociated ammonia levels ranging from 0.66 to 3.03 mg/L, with an average undissociated ammonia level of 1.93 mg/L (CRWQCB-CVR, 2001a). Analytical results from discharges to the drain were used when no other flow, besides the discharge, was in the drain at the time of the inspection and sample collection. All of the samples contained undissociated ammonia levels above the CDFG criterion of 0.02 mg/L.

Extent of Impairment

Avena Drain begins on a dairy farm east of Brennan Avenue in San Joaquin County. Ten of the 12 dairies along the drain are located on the upper 6 ½ miles.

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Potential Sources

The source of the ammonia in Avena Drain is from manure carried in dairy wastewater. The samples were taken during known discharges of wastewater.